

Equipment	Date	Problem	Remedy	Ship Name
Radar	27-Jan-88	Radar was turned off and when power was applied, unit would not come on.	Found fuse (F3) on indicator power module blown, also transistors (Q1 & Q2) shorted. Replaced transistor, radar now functioning.	SS Ruth Lykes
Radar	23-Feb-88	No transmit on short or medium pulse.	Replaced pulse PCB at MTR.	SS Ruth Lykes
Radar	03-Mar-88	No targets, slow blink, loss of high voltage at MTR.	Troubleshooting revealed capacitor between RT1 and Q6 has broken solder joint. Soldered capacitor.	SS Ruth Lykes
Radar	05-Mar-88	Unit transmits for 1 second then stops for about 10 seconds.	Replaced magnetron, unit back in operation.	SS Ruth Lykes
Facsimile	28-Feb-88	Unable to start fax machine.	Found "NO PAPER" switch defective. Replaced switch.	SS Ruth Lykes
Transmitter	11-Jan-88	Transmitter hard to load and weak power output.	Found capacitor located between HF coupler and antenna was broken. Replaced capacitor.	SS Ruth Lykes
Transmitter	29-Feb-88	High voltage power supply fuse keeps blowing.	Replaced tubes (V-502 & V-503).	SS Ruth Lykes
Transmitter	11-Mar-88	CG radio station reports erratic keying.	Replaced keying relay (K1).	SS Ruth Lykes
Transmitter	14-Jan-88	When transmitter keyed, audio still present at receiver.	Found relay (K1) bad and diodes (CR1, CR2 & CR3) shorted. Replaced diodes with new and made temporary repairs for relay.	SS Ruth Lykes
Radar	09-Feb-88	When control is in standby, antenna still rotates. Requested to modify so antenna motor can be shut off without going to the MTR.	Mounted switch between ground and other side to TB 4001 post 7, which control K4 of MTR.	SS Ruth Lykes
Receiver	07-Feb-88	Blower motor hot and will not turn.	Replaced with new blower motor.	SS Ruth Lykes
Ships Clock	12-Feb-88	Engine room clock has not worked for 8 months.	Repaired clock.	SS Ruth Lykes
Distribution Amplifier	19-Feb-88	Crew reports weak or no signals on all stations.	Found transformer (T1) wired as 300ohm instead of 600 ohm, also wire in secondary of transformer broken. Rewired transformer and repaired broken wire.	SS Ruth Lykes
Battery Charger	21-Feb-88	Will not charge walkie-talkie.	Cleaned charging contacts.	SS Ruth Lykes
Radar	20-Mar-88	Plotting window broke at sea.	Replaced plotting window.	SS Ruth Lykes
Receiver	21-Mar-88	Pre-selector band switch very hard to turn with outer knob.	Dismantled receiver, found pre-selector assembly out of alignment. Aligned and lubricated shaft.	SS Ruth Lykes
Receiver	22-Mar-88	Blower motor hot and will not turn.	Installed new blower motor.	SS Ruth Lykes
Radar	10-Apr-88	Target pick up and display about every 3rd sweep.	Replaced AFC XTAL.	SS Ruth Lykes
Radar	12-Apr-88	Target picked up and displayed about every third sweep. AFC unlocked, targets ok on manual and AFC XTAL CK's good.	Found V-612/5654 AFC I.F. AMPL tube bad and replaced. Aligned L.O. and set xtal current.	SS Ruth Lykes

Equipment	Date	Problem	Remedy	Ship Name
Modulator for 2012B Transmitter	15-Apr-88	Modulator makes a loud buzzing sound when turned on. Removed relay RL-504 - found filings on relay contacts.	Cleaned relay and re-installed.	SS Ruth Lykes
Radar	18-Apr-88	10cm Radar inoperative, No + 300volt regulated voltage displayed on radar volt meter. Fuse blown.	Reworked and mounted caps of larger physical size.	SS Ruth Lykes
Radar	19-Apr-88	After repairing 300 volt reg. power supply, power to radar was applied. Operation check out revealed no radar targets. Radar magnetron meter reading-indicated very low mag current.	Replaced magnetron and aligned lo.	SS Ruth Lykes
Direction finder	21-Apr-88	No sharp null and area of apparent null 60 to 70 degrees.	Removed wires from terminal strip 1-4 finish/start, found 4/3 open and 2/12 ohms. Removed antenna to radio room-found wires 4/3 chafed into cut chafed area.Soldered wires together, isolated and reinstall	SS Ruth Lykes
Radar	26-Apr-88	Indicator blank-VRM leds out but t/r led slow blink F1 of indicator power supply blown.	Replaced Q1 and Q2.	SS Ruth Lykes
Radar	06-May-88	Indicator blank-VRM leds out but T/R indicator led slow blink F1 of indicator power supply blown.	Removed ind. power supply to bench. Replaced Q1 and then run for 2 hours.	SS Ruth Lykes
VHF/FM	08-May-88	Bridge VHF unit has intermittent mic.	Unsoldered mic from radio room unit and installed in bridge unit. Re-installed bridge mic in radio room unit and ordered new mic for radio room.	SS Ruth Lykes
Radar	08-May-88	Mate reports intermittent gain. Found gain pot rotating with knob.	Dismantled, replaced nut and tightened then put back together.	SS Ruth Lykes
Radar	16-May-88	3cm radar blowing line fuse, replaced 1-1/2 amp fuse with 1 amp but Q1 and Q2 still shorted, again.	Testing revealed that radar worked for hours in long range above 6mi. but woul blow fuse in short range after 15-20 mins. Last Q1&Q2 installed.Radar to be left on long range.	SS Ruth Lykes
Radar	29-May-88	Radar works ok in long range above 6 mi., but will blow fuse in short PW after 15-20 mins. This will cause Q1&Q2 to short also.	Replaced sweep output assembly...A5400 P/N 585533-2.	SS Ruth Lykes
Radar	07-Jun-88	No targets.	Replaced mag and hart tube.	SS Ruth Lykes
Radar	16-Jun-88	Weak targets	Replaced RCVR XTALS	SS Ruth Lykes
Radar	24-May-89	EBL/Bug not coincident with VRM. 24 mile range ring not showing. Range rings and VRM not symetrical.	Adjusted PCB - A2A8, A2A9 and A2A10	Keystone Canyon
Emergency L/S transceiver	31-Dec-88	Service and maintenance	Serviced and maintence.	MV Archon
Radar	31-Dec-88	Crystals and TR cell.	Repaired and serviced.	MV Archon
Radar	31-Dec-88	TR cell magnetron crystals	Replaced all above svc.	MV Archon

Equipment	Date	Problem	Remedy	Ship Name
Emergency batteries	31-Dec-88	Servicing maintenance	Serviced log maintenance	MV Archon
Adline battery blinking	31-Dec-88	Servicing maintance.	Serviced maintained.	MV Archon
Batteries, genral alarm	31-Dec-88	Servicing maintance.	Serviced and maintained.	MV Archon
MF Tunner	31-Dec-88	MF tunner.	Ic's PCB repaired - tuned.	MV Archon
Crane battery charger	31-Dec-88	Maintance servicing.	Transferred radio room.	MV Archon
Receiver (main)	31-Dec-88	Speaker	Replaced new one	MV Archon
SatCom	31-Dec-88	Gyro	Replaced with new ones.	MV Archon
EPIRB	31-Dec-88	Serviced battery.	Overhauled antenna.	MV Archon

**B**

## RADAR MAINTENANCE LOG, S/S TYSON LYKES/WSCJ

DATE	RADAR SYMPTOMS AND REPAIRWORK PERFORMED.
05/02/76	10-CM, SHOWS POOR TARGETS, LAND 20 MILES, SHIP 10 MILES. POOR ALIGNMENT OF TR CELL AND VIDEO GAIN SETTING. ADJUSTED TR USING AN OSCILLOSCOPE ON FIXED BEARING OVER LAND TARGET.
05/03/76	3-CM, LOST TARGETS. LOSS OF HV AT MODULATOR. RESET POWER TO RE-ENERGIZE MODULATOR HV OVERLOAD RELAD. HV NOW RESTORED, TARGETS OKAY.
05/10-76	10-CM, SHOWING POOR LAND TARGETS OFF MEXICAN COAST. POOR ALIGNMENT OF VIDEO I.F. AMPLIFIER. ADJUSTED TR, AFC MIXER AND SIGNAL XTAL FOR RECOMMENDED CURRENTS AND MAXIMUM TARGETS WITH OSCILLOSCOPE CONNECTED TO VIDEO AMPLIFIER OUTPUT.
05/11/76	10-CM, RADAR SHOWING NO TARGETS. LOSS OF LV POWER SUPPLY. REPLACED FUSE F-7 IN LOW VOLTAGE POWER SUPPLY. ALSO ALIGNED SWEEP BRIGHTNESS AND RANGE RINGS, TARGETS NOW OKAY.
05/14/76	10-CM, NO TARGETS, NO SWEEP, NO 16KV VOLTAGE AT CRT ANODE. FOUND "OPEN" 10-OHM RESISTOR IN 16KV CRT POWER SUPPLY.
05-15-76	10-CM, ANTENNA SCANNER NOT TURNING, STOPPED DEAD IN WIND. BELT FOUND TO BE OFF SCANNER PULLEY, BEARING SHOWS EXCESSIVE PLAY IN ANTENNA SCANNER GEARBOX. PLACED CRT HV OF 10CM INTO 3CM RADAR, CRT HV MODULE SWAPPED. 10CM NOW OK, HOWEVER 3CM HAS INOPERATIVE CRT HV POWER SUPPLY.
05-18-76 AND 05-19-76	10-CM, ARRIVED PORTLAND, OREGON WITHOUT HIGH VOLTAGE ON CRT ANODE. FOUND 16KV POWER SUPPLY INOPERATIVE. CONTACTED ITT MARINE, ALSO PROGRESS ELECTRONICS. NEITHER FACILITY ABLE TO SUPPLY NEW CRT HV UNIT OR OBTAIN SPARES PARTS THAT MIGHT ALLOW US TO REPAIR OUR DEFECTIVE UNIT. ITT SEATTLE NOTIFIED, TOLD TO OBTAIN PARTS FOR OUR ARRIVAL THERE.
05-20-76	10-CM, ARRIVED NEW WESTMINSTER, B.C. WITH 10-CM RADAR INOPERATIVE. FOUND BAD 16KV HV POWER SUPPLY TO CRT. JUMPERED CRT OF 3CM TO CRT OF 10-CM THEREBY PLACING HIGH VOLTAGE TO CRT OF BOTH RADARS. THIS WIRING CONFIGURATION TO CONTINUE UNTIL SHIPS ARRIVAL NEXT PORT.
05-22-76 0345 HRS LOCAL	3-CM, LOSS OF SWEEP. NO BRIGHTNESS ON CRT. NO 16KV. BLOWN FUSE F5 ON NEGATIVE 24V SUPPLY. REPLACED BLOWN 1-AMP FUSE F5, NORMAL OPERATION RESTORED.

06-04-76 10-CM, LOSS OF SWEEP AND BRIGHTNESS ON CRT, ALSO NO  
0100 HRS 15KV. BLOWN FUSE F5 ON NEG 24V SUPPLY. REPLACED F5  
AND THEN CRT HV SUPPLY BEGAN SMOKING WITH NO  
OUTPUT. CHANGED CRT 15KV MODULE WITH ONBOARD SPARE.  
RADAR THUS RESTORED TO NORMAL OPERATION.

06-06-76 10-CM, ANTENNA NOT TURNING. PROBLEM APPEARS TO BE  
IN ANTENNA GEARBOX. VESSEL AT SEA IN HEAVY WEATHER.  
NO REPAIRWORK ATTEMPTED UNTIL WEATHER MODERATES.

06-08-76 10-CM, ANTENNA NOT ROTATING. 2 DRIVE BELTS OFF,  
THREE BOLTS OF HALF-INCH DIAMETER LOOSE INSIDE  
GEARBOX-SCANNER UNIT. BELTS PUT BACK ON PULLEYS,  
3 BOLTS TIGHTENED, RADAR OKAY NOW.

06-21-76 10-CM, PPI SPOKING ON RANGES BELOW 3 MILES. POOR  
ALIGNMENT OF KLYSTRON, MIXER AND TR CELL. ALIGNED  
KLYSTRON, MIXER, TR, SIGNAL DIODE SLUGS. NO  
SPOKING NOW. TARGETS GOOD AT 35 MILES WHILE VESSEL  
AT ANCHOR IN KEELUNG, TAIWAN.

06-26-76 10-CM, NO BRIGHTNESS OR SWEEP ON PPI. LOSS OF  
POSITIVE 100 VOLTS AT INDICATOR UNIT. REPLACED F7  
FUSE IN 100 VOLT POWER SUPPLY. RADAR NOW OKAY.

07-04-76 3-CM, PPI SPOKING AND TARGETS FAIRLY WEAK.  
MALALIGNMENT OF SIGNAL MIXER, AFC AND LOCAL  
OSCILLATOR CIRCUITS. ALIGNED KLYSTRON, SIGNAL  
MIXER AND AFC XTAL CURRENTS. RADAR NOW WORKING  
NORMALLY.

07-05-76 10-CM, BEARING CURSOR INOPERATIVE. BINDING OF  
ROLLERS, BAD SPRING TENSION. ADJUSTED AND FREED  
ROLLERS, ADJUSTED SPRING TENSION, CLEANED PLASTIC  
AND GLASS VIEWING LENSE ASSEMBLIES OF PPI AND  
CURSOR.

07-06-76 3-CM, TARGETS ON MANUAL OKAY BUT POOR ON AFC MODE.  
ALIGNED SIGNAL MIXER, KLYSTRON AND XTAL CURRENTS.

07-29-76 3-CM, LOSS OF TARGETS AND ANTENNA NOT ROTATING.  
BLOWN FUSE AT TR REGULATED POWER SUPPLY. REPLACED  
BLOWN 6-AMP GLASS FUSE IN REGULATED POWER SUPPLY.

07-30-76 10-CM, LOSS OF MODULATOR HIGH VOLTAGE WHEN RANGES  
ARE SWITCHED. CONTACTS ON 12VDC RELAY CB5-A IN  
MODULATOR HIGH VOLTAGE ARE SLUGGISH AND STICKING.  
REPLACED ENTIRE RELAY FROM SPARE ONBOARD.

08-09-76 10-CM, RADAR HAS NO PICTURE, MODULATOR HIGH VOLTAGE  
1600 HRS RELAY IS CHATTERING, MODULATOR TUBE IS ARCING.  
LOCAL REPLACED TYPE 4C35 MODULATOR TUBE, FROM ONBOARD  
SPARES, TO RETURN RADAR PICTURE TO NORMAL.

08-12-76 3-CM, RADAR INOPERATIVE AT ELAPSED TIME 1486 HRS. RADAR BLOWING FUSE IN 300-VOLT SUPPLY. ARCING HEARD AND SMOKE DETECTED IN RECEIVER CHASSIS. ON INSPECTION, FOUND 15,000 OHM 1-WATT RESISTOR BURNED AND ARCING. THIS RESISTOR LOCATED ON PRINTED CIRCUIT BOARD JUST BEHIND TUNING CONTROL OF RCVR CHASSIS AND NOT IDENTIFIED AS SHIP HAS NO SCHEMATIC DIAGRAMS OF THIS RADAR SECTION. THIS RESISTOR, 15K 1-WATT, REPLACED WITH 18-K 1-WATT FROM SPARES ONBOARD. RADAR NOW FUNCTIONS OKAY ON ALL RANGES. HOWEVER, CURRENTS OF XTAL A, XTAL B, AND AFC XTAL ARE VERY LOW ON METER. ENTIRE RCVR CHASSIS NOW CHANGED-OUT (WITH SPARE RCVR CHASSIS ONBOARD). 3-CM RADAR NOW WORKING WELL ON ALL RANGES BUT AFC XTAL CURRENT IS LOWER THAN IT SHOULD BE. XTAL-A AND XTAL-B CURRENTS ALSO SEEM LOWER THAN THEY SHOULD BE.

09-08-76 10-CM, NO TRACE, LOSS OF 100V. REPLACED 1/2-AMP FUSE IN 100V POWER SUPPLY TO RESTORE RADAR TO NORMAL OPERATION.

09-25-76 10-CM, TARGETS WEAK, NO SHIPS BEYOND ABOUT 14 MILES. MALALIGNMENT OF RF MIXER, SIGNAL MIXER AND TR CELL. ADJUSTED TR, SIGNAL MIXER AND AFC TO GIVE GOOD SHIP TARGETS AT 30 MILES AND LAND AT 50 MILES, SPOKING NOW STOPPED ON LOW RANGES, RADAR NOW OKAY.

04-02-77 10-CM, POOR TARGETS PAST 20 MILES, BAD TR ALIGNMENT. ALIGNED TR ON CATALINA ISLAND WHILE DOCKED IN LONG BEACH. ECHO OKAY ON TARGETS AS FAR AS 40 MILES.

04-02-77 10-CM, ON DEPARTING LONG BEACH, SYNCHRO NOT WORKING. SCANNER TURNING BUT SYNCHRO ON CRT INOPERATIVE. RADAR SHUTDOWN. NO REPAIRS ATTEMPTED DUE TO DARKNESS, WORK OR INSPECTION ALOFT POSTPONED UNTIL DAYLIGHT AND NEXT PORT.

04-03-77 VESSEL DOCKED AT SAN DIEGO. 10-CM, ERRATIC SWEEP ON PPI, SERVO-VIDEO SYSTEM BAD. POOR ALIGNMENT OF SERVO-VIDEO POTS R1,R2 AND R3. SET GAIN AND NOTCH LEVELS OF CIRCUIT BOARD BD-2. ADJUSTMENTS MADE TO R1,R2 AND R3 PER INSTRUCTION MANUAL USING OSCILLOSCOPE ON R35.

04-06-77 3-CM, VESSEL DOCKED AT SAN FRANCISCO, SWEEP VERY WEAK, LACKS BRIGHTNESS, DEFECTIVE CIRCUIT BOARD #3. REPLACED BOARD #3 WITH SHIPBOARD SPARE. DEFECTIVE BOARD THEN SENT ASHORE FOR REPAIR BY ITT AT BERKELEY. RADAR NOW NORMAL, SWEEP OKAY.

04-07-77 10-CM, VESSEL AT SEA, SWEEP ERRATIC, NOT FOLLOWING  
1600 HRS PROPERLY. ALIGNED SERVO BOARD BD-3 AT POINTS R1,R2  
AND R3 PER MAINTENANCE BOOK. SWEEP NOW GOOD, RADAR  
WORKING NORMALLY.

04-21-77 10-CM, POOR TARGETS AND ERRATIC SWEEP. APPEARS  
0800 AND SERVO-VIDEO AND R.F. SECTION NEEDS ALIGNMENT.  
1200 HRS ALIGNED POT R3 ON SERVO-VIDEO BOARD PLUS TR CELL  
LOCAL. AND LOCAL OSCILLATOR ADJUSTMENTS.

04-22-77 3-CM, SCANNER INOPERATIVE. FOUND BROKEN DRIVEBELT  
AND LOOSE BOLTS ON SCANNER BEARINGS. CHANGED  
(REPLACED) DRIVEBELT AND PUT 2 BOLTS BACK INTO  
METAL MOUNTING PLATE OF THRUST BEARING. ALIGNED  
LOCAL OSCILLATOR (KLYSTRON STRUT) AND ADJUSTED  
HEADING FLASHER. VESSEL AT KAOHSIUNG, TAIWAN.  
RADAR NOW WORKING OKAY.

04-25-77 10-CM, VIDEO SWEEP INTERMITTENT AND FAILS TO FOLLOW  
SERVO PROPERLY. DEFECTIVE EHT POWER SUPPLY.  
SERVO-VIDEO BOARD DIFFICULT TO ALIGN. PLACED SPARE  
EHT POWER SUPPLY INTO SERVICE. SWAPPED SERVO-VIDEO  
BOARD WITH THAT USED IN 3-CM RADAR. ALL OKAY NOW.

04-26-77 10-CM, VIDEO SWEEP INTERMITTENT. VESSEL AT SEA,  
GLASS NECK OF CRT FOUND TO BE RUBBING AGAINST  
ROTATING DEFLECTION COIL. POSITIONED CRT MOUNTING  
BOLTS TO REMOVE RUBBING AGAINST DEFLECTION COIL.  
RADAR NOW WORKING NORMALLY.

05-23-77 3-CM AND 10-CM RADARS UNDERGOING VARIOUS AND  
EXTENSIVE REPAIRS BY ITT MACKAY TECHS DURING PAST  
WEEK OR 10 DAYS WHILE VESSEL DOCKED AT ALAMEDA.  
WORK REPORT IN RADIO ROOM FILES.

05-26-77 3-CM AND 10-CM RADARS UNDERGOING VARIOUS REPAIRS  
BY ITT MACKAY TECHS WHILE VESSEL DOCKED AT LONG  
BEACH. WORK REPORT IN RADIO ROOM FILES.

05-27-77 10-CM, VESSEL AT SEA, RADAR SHOWS POOR TARGETS  
COMPARED TO THOSE OF 3-CM SYSTEM. ALIGNED KLYSTRON  
STRUT, CRYKSTAL CURRENTS AND TR CELL. TARGETS NOW  
MATCH THOSE OF THE 3-CM RADAR.

06-06-77 3-CM, VESSEL AT SEA, RADAR SHOWING POOR TARGETS  
COMPARED TO 10-CM SYSTEM. FOUND CORROSION AND  
CLEANED SAME AT JUNCTIONS OF TR CELL AND WAVEGUIDE  
FLANGE. REPLACED TR CELL AND PEAKED KLYSTRON STRUT  
IN MANUAL MODE. AFC, HOWEVER, FAILING TO HOLD MORE  
THAN BRIEFLY.



06-07-77 10-CM, VESSEL AT YOKOHAMA, RADAR SHOWING POOR TARGETS. ALIGNED KLYSTRON STRUT, TR CELL AND CRYSTAL CURRENTS. ALSO TIGHTENED LOOSE BOLTS IN RF SECTION AND REPAIRED LOOSE COAX ON BNC CONNECTOR AT SIGNAL MIXER SECTION.

06-10-77 10-CM, VESSEL AT SEA, RADAR SHOWING WEAK TARGETS. CHECKED ALIGNMENT OF KLYSTRON, TR AND CRYSTALS AND THEY APPEARED OKAY. TARGETS REMAIN WEAK, THEN FOUND LOOSE BOLTS AT ROTARY JOINT WITH JOINT AND WAVEGUIDE SECTION SHOWING BAD ALIGNMENT TO EACHOTHER AND CONSIDERABLY WORN. FURTHER REPAIRS IMPOSSIBLE DUE TO HEAVY WEATHER.

06-12-77 10-CM, VESSEL NOW AT KAOHSIUNG TAIWAN AND WEATHER MUCH IMPROVED SO LOOKED INTO DAMAGED WAVEGUIDE SECTION. BOLTS AT ROTARY JOINT AND EXIT OF WAVEGUIDE FROM PEDESTAL LOOSE OR MISSING. ROTARY JOINT NO LONGER RUBBING AND TARGETS PRETTY GOOD WITH LOOSE BOLTS RE-INSTALLED AT ROTARY JOINT AND WAVEGUIDE.

06-15-77 3-CM, VESSEL AT BUGO, PHILIPPINES. PEAKED KLYSTRON AND XTAL CURRENTS ON NEARBY LAND TARGETS. 3-CM RADAR SHOWING TARGETS TO 50 MILES AND CONSIDERED GOOD. AFC HAD GIVEN PROBLEMS AND NOT LOCKING, AFC THEREFORE ADJUSTED.

06-19-77 3-CM. VESSEL AT SEA, RADAR NOW SHOWING WEAK TARGETS ON AFC AND MANUAL SETTING CHANGES DURING PERIOD OF OPERATION. REPLACED 2K25 KLYSTRON, ALIGNED CRYSTAL CURRENTS AND TUNING. TARGETS NOW OKAY, BOTH AFC AND MANUAL MODE MODES OF OPERATION ARE STABLE.

06-24-77 3-CM, VESSEL AT SEA, RADAR INOPERATIVE AND NO TARGETS. FOUND WATER HAD ENTERED WAVEGUIDE SECTION DUE TO LEAKS IN FIBERGLASS SCANNER. ALSO FOUND KLYSTRON TO HAVE OPEN FILAMENT. NO SPARE KLYSTRON ONBOARD AND UNABLE TO REMOVE ALL WATER FROM WAVEGUIDE (NIGHT TIME). AWAITING REPAIRS IN JAPAN.

06-25-77 3-CM, VESSEL AT YOKOHAMA, WITH ASSIST OF JAPANESE  
AND TECHNICIANS CLEARED 3-CM ROTARY JOINT AND WAVEGUIDE  
06-26-77 OF WATER. A NEW 3-CM KLYSTRON INSTALLED AND  
SILICONE CEMENT USED TO PATCH CRACKS AROUND 3-CM  
SCANNER. NEW 10-CM MAGNETRON INSTALLED AND BOTH  
RADARS NOW WORKING OKAY BUT 10-CM HAS BADLY WORN  
ROTARY JOINT AND BEARING.

07-07-77 3-CM, VESSEL AT LONG BEACH, RADAR SPOKING ON 48-MI RANGE. MALADJUSTMENT OF SWEEP VIDEO POT. ADVANCED SWEEP VIDEO GAIN POT UNTIL SPOKING ON 48-MI RANGE DISAPPEARS. ALSO PEAKED TUNING AND KLYSTRON STRUT USING NEARBY CATALINA ISLAND AS MY TARGET.

07-07-77 10-CM, VESSEL AT LONG BEACH, RADAR HEADING FLASHER AND PICTURE ORIENTATION HAS ERROR OF 11-DEGREES TO THE LEFT. VIBRATION HAS CAUSED SLIPPAGE OF SERVO MOTOR MOUNT AT NECK OF CATHODE RAY TUBE. LOOSENED SERVO MOTOR BOLTS AND ORIENTED FLASHER AND PICTURE TO PROPER AZIMUTH. ALSO PEAK TUNING, KLYSTRON, TR CELL USING NEARBY CATALINA ISLAND AS TEST TARGET.

07-08-77 3-CM AND 10-CM PROBLEMS, VESSEL AT SAN FRANCISCO.  
AND ITT-MACKAY TECHNICIANS INSTALLED NEW 10-CM ANTENNA  
07-09-77 PEDESTAL, AND NEW 3-CM FIBERGLASS SCANNER. THIS DUE TO HISTORY OF ROTARY JOINT FAILURES ON 10-CM PEDESTAL AND LEAKAGE OF RAINWATER TO WAVEGUIDE VIA CRACKS IN 3-CM ANTENNA.

07-12-77 10-CM, VESSEL AT LONG BEACH, RADAR INOPERATIVE.  
AND ITT-MACKAY TECHS FOUND RCVR MIXER CURRENT ERRATIC  
07-13-77 AND REMADE INTERMITTENT COAX CONNECTIONS ON RCVR SIGNAL XTAL COAX CABLES, ADJUSTED KLYSTRON INJECTION PROBE, FOUND MAGGIE CURRENT LOW AND REPLACED MAGNETRON. REMOVED SCANNER TO DOCK AND DUE TO WATER LEAKAGE, COATED WITH 2 APPLICATIONS OF EPOXY AND DRILLED 2 HOLES IN BOTTOM OF FIBERGLASS SCANNER TO ALLOW FUTURE WATER TO DRAIN.

07-14-77 3-CM, VESSEL AT SEA, NO SEA RETURN IN AFC MODE, MANUAL MODE OKAY. KLYSTRON TUNING OFF FREQUENCY AFTER SYSTEM WARMUP 12 HOURS. ADJUSTED TUNING AFTER 12 HOURS WARMUP AND AFC NOW HOLDING OKAY.

07-14-77 10-CM, VESSEL AT SEA, TARGETS WEAK AND BROKEN, WORSENING PAST 12 HOURS. APPEARS KLYSTRON TUNING HAS SLIPPED OFF FREQUENCY. RETUNED KLYSTRON STRUT, TUNING POT, AND TR CELL PER TECH MANUAL AND FULL SENSITIVITY OF RADAR RESTORED.

02-28-78 10-CM, VESSEL AT YOKOHAMA. NO HIGH-VOLTAGE PRESENT ON MODULATOR, TARGETS WEAK. FOUND VRM BOARD #4 TO BE DEFECTIVE. REPLACED CIRCUIT BOARD 4 WITH ONBOARD SPARE. INSTALLED NEW MAGNETRON, NEW MODULATOR, AND NEW KLYSTRON. RADAR OPERATION NOW RETURNED TO NORMAL.

03-06-78 10-CM, VESSEL AT HONG KONG. SERVO MOTOR ON ANTENNA-  
AND PPI SYSTEM ERRATIC, CAUSE UNKNOWN. TROUBLESHOOTING  
03-07-78 2PM UNTIL 8PM BY RADIO OFFICER AND TWO SHORESIDE TECHS FAILS TO PINPOINT PROBLEM.

03-09-78 3-CM, VESSEL AT SEA, TARGETS WEAK. TARGETS IMPROVED BY INSTALLING NEW TR, SIGNAL XTAL, AND MODULATOR TUBE AND ALIGNING TR AND KLYSTRON.

03-11-78 3-CM, VESSEL AT SEA, PICTURE AND HEADING FLASHER SHOWS 30-DEGREE BEARING ERROR. FOUND LOOSE BOLTS ON CRT SERVO MOTOR MOUNT. ALIGNED SERVO TO PROPER TARGET AZIMUTH WITH CAPTAINS ASSISTANCE AND TIGHTENED SERVO MOUNTING BOLTS.

03-11-78 3-CM, VESSEL APPROACHING BUSAN KOREA, TARGETS WEAK. REPLACED 3-CM MAGNETRON AND ALIGNED KLYSTRON AND TR CELL. TARGETS NOW OKAY TO 40 MILES.

03-14-78 10-CM, VESSEL AT KOBE JAPAN, TARGETS NOT PRESENT, HEADING FLASHER SHOWS ERRATIC AZIMUTH. FOUND LOOSE PULLEY ON SYNCHRO SHAFT IN ANTENNA PEDESTAL, INSTALLED NEW NUT AND CEMENTED WITH EPOXY. FOUND FUSES BLOWN IN 100 AND 200 VOLT POWER SUPPLY, NEW FUSES INSTALLED. FOUND DEFECTIVE IN909 DIODE IN HEADING FLASHER CIRCUIT AND REPLACED. FOUND BAD XTAL IN SIGNAL MIXER ASSEMBLY, REPLACED AND ALIGNED TR CELL AND KLYSTRON. TARGETS OKAY 40 MILES.

05-08-78 10-CM, VESSEL AT PORTLAND OREGON, RADAR HAS NO HEADING FLASHER, NO RANGE RINGS. FOUND DEFECTIVE FLASHER MICROSWITCH, BAD PCB #1. INSTALLED NEW HEADING FLASHER MICROSWITCH, INSTALLED NEW PCB #1. ADJUSTED RANGE RING POT, PEAKED KLYSTRON TUNING.

05-27-78 10-CM, VESSEL AT YOKOHAMA, RADAR INOPERATIVE, FOUND BROKEN UPPER DRIVEBELT IN ANTENNA PEDESTAL. TORE-DOWN ANTENNA PEDESTAL PARTS, FOR SUBSEQUENT CHANGEOUT OF DRIVEBELT.

05-28-78 3-CM, VESSEL AT YOKOHAMA, RADAR HAS NO SWEEP ON RANGES BELOW 12 MILES. PRINTED CIRCUIT BOARD #2 DEFECTIVE. CHANGED PCB #2, ALIGNED SWEEP POTS, SHIPS SAILING DELAYED APPROX 1-HOUR DUE TO THIS FAILURE.

05-29-78 10-CM, VESSEL NOW AT KOBE JAPAN, PER LOG ENTRY ABOVE, WE STILL HAVE BROKEN UPPER DRIVEBELT IN 10-CM RADAR ANTENNA SCANNER. NOW INSTALLED NEW DRIVEBELT WITH AID OF 3 JAPANESE TECHNICIANS AND SHIPS ABLE-BODIED SAILORS, ALIGNED HEADING FLASHER AND RADAR NOW WORKING OKAY.

06-04-78 10-CM, VESSEL AT BUSAN KOREA, RADAR HAS NO TARGETS,  
AND  
06-05-78 KLYSTRON TUNING, XTAL CURRENTS, TR CELL FOR MAX TARGETS. ALIGNED SWEEP AMPLIFIER POTS FOR PROPER RANGE RINGS.

06-06-78 3-CM, VESSEL AT KOBE JAPAN, RADAR HAS NO TARGETS ON RANGES ABOVE 6 MILES. PULSE FORMING NETWORK PER SCHEMATIC 32-Z1 DEFECTIVE. JAPANESE TECHS ASSIST RADIO OFFICER IN CONFIRMING THRU TESTS THAT NETWORK 32-Z1 DEFECTIVE. NO REPLACEMENT AVAILABLE. NEW NETWORK ORDER FROM STATESLINE PER TELEX YOKOHAMA 8 JUNE 1978.

06-17-78 3-CM, VESSEL AT LONG BEACH. PER ABOVE LOG ENTRY,  
AND RADAR INOPERATIVE DUE TO DEFECTIVE PULSE FORMING  
06-18-78 NETWORK. INSTALLED NEW PULSE FORMING NETWORK. ALIGN XTAL CURRENTS, KLYSTRON, AND SWEEP LENGTH POTS. RADAR NOW WORKING WELL AND TARGETS GOOD ON ALL RANGES.

06-21-78 10-CM, VESSEL AT SEA, PICTURE SWEEP TOTALLY MILKY, NO TARGETS. FOUND SHORTED DIODE IN VIDEO-SERVO CIRCUIT BOARD #2. REPLACED TYPE 1N909 DIODE, COMPONENT CR-5 ON VIDEO-SERVO BOARD #2.

06-21-78 10-CM, VESSEL AT SEATTLE, WEAK HEADING FLASHER,  
AND PPI SWEEP SERVO ERRATIC, LAND TARGETS ONLY TO 20  
06-22-78 MILES, VRM COUNTER AND 6-MI RANGE LAMPS NOT BURNING. REPLACED PCB #2, ADJUSTED SERVO GAIN AND NOTCH FILTERS. REPOSITIONED CRT DUE TO NECK RUBBING DEFLECTION COIL. PEAKED KLYSTRON XTAL AND TR CELL. REPLACED TYPE 327 AND 1829 INDICATOR LAMPS. CLEANED DUST FROM INDICATOR, WASHED AIR FILTER ON RADAR TRANSMITTER CHASSIS.

06-28-78 10-CM, VESSEL AT LONG BEACH, RADAR SHOWS 26 DEGREE ERROR IN HEADING FLASHER AND PICTURE. MISALIGNMENT DUE TO VIBRATION OF SERVO, SYNCHRO, HEADING FLASH MICROSWITCH. PROPERLY ALIGNED SYNCHRO AND SERVO MOTOR MOUNTINGS, HEADING FLASH MICROSWITCH AND POTS R1,R2,R3 ON SERVO-VIDEO CIRCUIT BOARD.

06-30-78 10-CM, VESSEL AT SAN FRANCISCO, RADAR HAS ERRATIC SWEEP ROTATION AND LOOSE BOLTS ON SCANNER PEDESTAL MOUNTING. REPLACED DEFECTIVE ANTENNA SYNCHRO MOTOR WITH SHIPS SPARE. PEDESTAL BOLTS TIGHTENED OR RENEWED. REPLACED CRACKED ROTARY WAVEGUIDE JOINT, ADJUSTED SYNCHRO, SERVO, FLASHER AZIMUTHS.

06-30-78 3-CM, VESSEL AT SAN FRANCISCO, RADAR CRT SWEEP SUDDENLY STOPPED TURNING DURING RADAR CHECKOUT AT PIER 80. DEFECTIVE SERVO DRIVE MOTOR IN INDICATOR UNIT. INSTALLED SERVO MOTOR, TAKEN FROM 3CM RADAR OF NEARBY VESSEL SS ILLINOIS WHICH IS BOUND FOR SHIPYARD FROM PIER 80. ADJUSTED SERVO POTS R1,R2,R3 ON PCB #2 FOR SMOOTH SWEEP AND PROPER TARGET BEARINGS.

07-09-78 10-CM, VESSEL AT SEA, RADAR HAS ERRATIC PICTURE SWEEP ON CRT OF INDICATOR UNIT. CHANGED PCB #2 IN INDICATOR UNIT, ALIGNED GAIN AND NOTCH POTS FOR SMOOTH PICTURE SWEEP.

07-10-78 10-CM, VESSEL AT YOKOHAMA, RADAR HAS INTERMITTENT SWEEP ON CRT WHEN VESSEL VIBRATES. TROUBLESHOOTING WITH OSCILLOSCOPE SHOWS GOOD SIGNAL SYNCHRO #1 AND #3 WINDING BUT NONE FROM #2. SUSPECT BAD CABLE FROM TR UNIT TO ANTENNA SYNCHRO ON RADAR MAST.

07-12-78 10-CM, VESSEL AT KOBE JAPAN. PER ABOVE LOG ENTRY, RADAR HAS ERRATIC PICTURE SWEEP ON CRT OF INDICATOR UNIT. INTERMITTENT CABLE FROM TR UNIT IN CHARTROOM TO SYNCHRO WINDING #2 ON RADAR SCANNER MAST. DISCONNECTED DEFECTIVE WIRE AT TR STRIP AND ANTENNA SYNCHRO, THEN UTILIZED A SPARE WIRE IN CABLE TO SUPPLY SYNCHRO SIGNAL.

07-13-78 3-CM, VESSEL AT SEA, RADAR SHOWS LOSS OF TARGETS ON CRT SCREEN. DEFECTIVE 1N23 CRYSTAL. REPLACED 1N23 SIGNAL CRYSTAL, ALIGNED TR AND KLYSTRON FOR MAXIMUM TARGETS TO 25 MILES OR BETTER.

07-14-78 10-CM, VESSEL AT NAHA OKINAWA. RADAR SHOWS COMPLETE LOSS OF SEA RETURN AND TARGETS. WATER IN WAVEGUIDE JOINTS FOLLOWING HEAVY RAIN. OPENED WAVEGUIDE JOINTS AT SIX PLACES ALONG THE RUN. DUMPED WATER AT TO POINTS, PIPED COMPRESSED AIR 2 HOURS TO DRY. INSTALLED NEW O-RING GASKET AT ANTENNA PEDESTAL WAVEGUIDE FLANGE.

07-21-78 3-CM, VESSEL AT BUSAN KOREA. RADAR HAS NO SWEEP OR PICTURE ON 3 AND 6 MILE RANGES. BLOWN FUSE IN 5-VOLT AND 100-VOLT POWER SUPPLIES. REPLACED 2 BLOWN FUSES AND ALIGNED SWEEP POTS OF 3 AND 6 MILES RANGES FOR PROPER FIXED RANGE MARKERS.

08-02-78 10-CM, VESSEL AT SEA. RADAR PICTURE SWEEP ROTATION ERRATIC ON INDICATOR CRT. TOUCHED-UP POT R2 WHICH IS NOTCH FILTER OF SERVO-VIDEO BOARD, MOVING IT CCW ONE-HALF TURN. SWEEP NOW NORMAL.

02-25-79 10-CM, VESSEL AT SEA. RADAR SHOWS LOSS OF TARGETS BEYOND ABOUT 7 TO 8 MILES DISTANCE. CORROSION IN PROBE OF CRYSTAL SIGNAL MIXER ASSEMBLY. TESTS WITH OSCILLOSCOPE AT SIGNAL CRYSTAL SHOW ERRATIC CURRENT, CLEANED AND POLISHED SIGNAL PROBE AND TR FINS. TARGETS 45 MILES OKAY.

02-26-79 3-CM, VESSEL AT SEATTLE. RADAR SHOWS WEAK SENSITIVITY. NO TARGETS OF LAND BEYOND 15 MILES. RF CIRCUITRY NOT ALIGNED AT MAXIMUM PERFORMANCE. ALIGNED KLYSTRON STRUT, AFC TUNING, CRYSTAL CURRENTS AND 2 SLUGS IN FRONT SECTION OF I.F. AMPLIFIER. TARGETS 40 MILES OKAY.

03-15-79 10-CM, VESSEL AT SEA. RADAR SHOWS WEAK SENSITIVITY,  
0915- LOW SWEEP BRIGHTNESS, VRM READS AN ERROR OF UP TO  
1035 HRS 2 MILES ON SOME RANGES AGAINST FIXED RINGS.  
LOCAL. ALIGNED TIMING R1, VRM-DIMMER C1-C2 PER TECH BOOK.  
ALIGNED KLYSTRON AND TR FOR MAX SEA RETURN. PEAKED  
SWEEP BRIGHTNESS POTS. VRM ERROR NOW 0.1 MILE MAX,  
BRIGHTNESS AND SEA RETURN APPEAR GOOD.

03-17-79 3-CM, VESSEL AT YOKOHAMA JAPAN. RADAR INOPERATIVE  
1600- DUE TO SEVERE ARCING AT HIGH VOLTAGE POST OF  
2000 HRS MAGNETRON. REMOVED MAGNETRON, RE-SOLDERED LEADS  
LOCAL. WITHIN ITS SHELL, FILED-AWAY BURNED AREA OF  
BAKELITE SHELL, APPLIED EPOXY CEMENT OVER AREA  
WHERE BAKELITE HAD BEEN BURNED-AWAY, ALIGNED  
KLYSTRON TUNING.

03-21-79 3-CM, VESSEL AT NAHA JAPAN. RADAR INOPERATIVE DUE  
0900- TO HV ARCING AT BOTH BANANA PLUGS OF MAGNETRON.  
1150 HRS BANANA PLUGS BADLY CORRODED AND WORN. INSTALLED 2  
LOCAL. NEW BANANA PLUGS AT MAGNETRON, ALIGNED KLYSTRON FOR  
MAX TARGETS, LAND SEEN AT OVER 20 MILES, SHIPS OKAY  
AT ABOUT 16 MILES.

06-04-79 10-CM, VESSEL AT SAN FRANCISCO. RADAR INOPERATIVE,  
AND DEFECTIVE RELAY K-1, DEFECTIVE TIMING CHAIN BOARD.  
06-05-79 BLOWN FUSE IN 275 VOLT POWER SUPPLY. WITH ITT  
ASSISTING, REPLACED TIMING CHAIN BOARD, VIDEO  
BOARD, VRM BOARD, AND FUSE IN 275 VOLT SUPPLY AND  
ALIGNED VRM RINGS PER TECH MANUAL PROCEDURES.

06-17-79 10-CM, VESSEL AT SEA. RADAR SHOWING SHIP TARGETS  
2100- ONLY TO 6 OR 7 MILES. REPLACED SIGNAL MIXER CRYSTAL  
2300 HRS TYPE 1N21E, REPLACED TR TUBE TYPE BTR-136, ALIGNED  
LOCAL. KLYSTRON AND TR. LAND TARGETS 45 MILES, SHIPS 23  
MILES SHOWING OKAY.

06-21-79 10-CM, VESSEL AT NAHA JAPAN. RADAR HAS NO SWEEP ON  
1930- 0.75 AND 1.5 MILES SCALES. ALSO NO HEADING FLASHER.  
2215 HRS BLOWN FUSE 1/8 AMP IN 275 VOLT POWER SUPPLY, AND  
LOCAL. DEFECTIVE Q-15 ON VIDEO PCB. REPLACED 1/8 AMP FUSE  
ON 275 VOLT POWER SUPPLY. REPLACED DEFECTIVE  
TRANSISTOR Q-15 IN HEADING FLASHER CIRCUIT. RADAR  
NOW OKAY.

06-29-79 3-CM, VESSEL AT SEA. RADAR HAS NO SEA RETURN OR TARGETS ON INDICATOR. H.V. ARCING FROM MAGNETRON CATHODE TERMINAL TO GROUND. FILED-AWAY BURNT BAKELITE OF MAGNETRON SHELL AND APPLIED EPOXY. FILED-AWAY SOME OF MOUNTING BRACKET EDGE WHERE ARC HAD BEEN. RADAR NOW WORKING OKAY.

07-08-79 3-CM, VESSEL AT BUSAN KOREA. RADAR HAS LAND TARGET ONLY TO 14 MILES AND APPEAR BEST ON MANUAL TUNING  
1930- RATHER THAN ON AFC MODE. ADJUSTED KLYSTRON STRUT  
2030 HRS AND TUNING CONTROL, SET MIXER CRYSTAL AND AFC  
LOCAL. CRYSTAL CURRENTS, LAND TARGETS SEEN TO 23 MILES AND NO CHANGE IN SENSITIVITY WHEN SWITCHED BETWEEN MANUAL AND AFC MODE.

07-12-79 10-CM, VESSEL AT YOKOHAMA. RADAR ANTENNA WON'T TURN. ONE WINDING OF 3 PHASE 1.5 HORSE MOTOR SHORTED. MOTOR RE-WOUND SHORESIDE YOKOHAMA YESTERDAY. TODAY RADIO OFFICER RE-INSTALLED MOTOR IN ANTENNA PEDESTAL.

02-07-80 3-CM, VESSEL AT HONG KONG. RADAR INDICATOR SWEEP WILL NOT FOLLOW SCANNER. DEFECTIVE SYNCHRO TRANSMITTER MOTOR ON ANTENNA PEDESTAL. NEW SYNCHRO ORDERED BY TELEX FROM HONG KONG, REQUESTING IT BE FLOWN TO KOBE OR YOKOHAMA.

02-15-80 3-CM, VESSEL AT YOKOHAMA. RADAR INDICATOR SWEEP WILL NOT FOLLOW SCANNER, AS PER ABOVE LOG ENTRY. INSTALLED NEW SYNCHRO MOTOR IN SCANNER PEDESTAL, HAVING RECEIVED IT AIR FREIGHT FROM SAN FRANCISCO.

02-26-80 3-CM, VESSEL AT SEA. RADAR HAS NO TARGETS OR SEA RETURN. ERRATIC CRYSTAL FUNCTION. REPLACED CRYSTALS 1N23D AND 1N23DR AND ADJUSTED KLYSTRON STRUT FOR 35 MILE TARGETS.

07-11-80 10-CM, VESSEL AT SEA. RADAR ANTENNA WON'T TURN. BADLY WORN DRIVEBELT TYPE 220-J-16. REPLACED DRIVEBELT FROM SPARE ONBOARD. PLACED 2 MORE ON ORDER AS NO FURTHER SPARE ONHAND.

07-25-80 10-CM, VESSEL AT HONOLULU. TARGETS FROM LARGE VESSELS NOT SHOWING BEYOND 12 MILES, LAND TO ABOUT 20 MILES. DEGRADED SENSITIVITY DUE TO SLIGHT OFF-TUNING OF TR CELL AND KLYSTRON SLUGS. SCANNER STOPPED ON LAND TARGETS. OSCILLOSCOPE SYNCED TO VIDEO R.F. LINE. KLYSTRON AND TR TUNED TO MAXIMUM VIDEO PULSE. SHIPS NOW SEEN AT 19 MILES, LAND AT 38 MILES DISTANCE.

08-02-80 3-CM, VESSEL AT LONG BEACH. TOTAL FAILURE OF RADAR, NO POWER INDICATIONS. BLOWN 2-AMP FUSE F-1 IN INDICATOR UNIT. REPLACED 2-AMP FUSE, WHICH APPARENTLY FAILED DUE TO POSSIBLE POWER SURGE AS VESSEL PREPARING TO DEPART BERTH.

08-05-80 3-CM, VESSEL AT SEA. NO SWEEP OR TARGETS ON 6 MILE RANGE. 6 MILE SWEEP POT ON VIDEO SWEEP BOARD INCORRECTLY SET. ADJUSTED SWEEP AMPLITUDE POTENTIOMETER 2-TURNS CLOCKWISE. 6-MILE SWEEP NOW RESTORED.

08-13-80 10-CM, VESSEL AT SEA. RADAR INOPERATIVE FOLLOWING SMOKE FROM TR CABINET. L.V. T/R POWER SUPPLY BURNED TRANSFORMER T-1 HOT AND SMOKING. COMPONENTS T-1 HOT, R-6 BURNED OPEN, CR-11 SHORTED. REPLACEMENT L.V. SUPPLY REQUESTED BY TELEGRAM TO SHIPOWNER.

08-19-80 10-CM, VESSEL AT YOKOHAMA. SEE 13 AUGUST ENTRY, ABOVE. INSTALLED NEW LV POWER SUPPLY, FURNISHED BY. SAN FRANCISCO. JAPANESE TECHS CALLED UPON TO ASSIST, FOUND DEFECTIVE Q-1 2N2905A IN NEW POWER SUPPLY JUST RECEIVED FROM SAN FRANCISCO. Q-1 NOW REPLACED, RADAR WORKING OKAY.

09-05-80 3-CM, VESSEL AT LONG BEACH. TARGETS WEAK AT RANGES  
1200- BEYOND 10 MILES. WEAK SIGNALS ATTRIBUTED TO BAD TR  
1345 HRS CELL. REPLACED TYPE VDX-1047-S TR CELL FROM SHIPS  
LOCAL. SPARES. ALIGNED TUNING CONTROL AND KLYSTRON STRUT.  
ADJUSTED SIGNAL MIXER AND AFC CRYSTAL CURRENTS.

09-08-80 3-CM, VESSEL AT SAN FRANCISCO. ERRATIC HEADING  
1900- FLASHER. DEFECTIVE HEADING FLASHER MICROSWITCH IN  
1945 HRS ANTENNA PEDESTAL. REPLACED HEADING FLASHER  
LOCAL. MICROSWITCH. ALIGNED FLASHER TO DEAD-AHEAD.

11-16-81 10-CM, VESSEL AT SEA. NO PICTURE SWEEP. FOUND  
0700- DEFLECTION COIL RUBBING NECK OF CRT. RE-ALIGNED  
0900 HRS COIL AND ADJUSTED R1,R2,R3 OF SWEEP AMPLIFIER.  
LOCAL.

11-18-81 3-CM AND 10-CM, VESSEL AT YOKOHAMA. 3-CM SPOKING  
1230- ON 0.75 MILE RANGE, 10-CM ON 24 MILES. ADJUSTED  
1430 HRS SWEEP AMPLIFIERS ON BOTH RADARS TO RESTORE NORMAL  
LOCAL. PICTURE.

11-21-81 3-CM, VESSEL AT KAOHSIUNG TAIWAN. TARGETS POOR  
2100- BEYOND 10 MILES OF RANGE. REPLACED 4C35 MODULATOR  
2300 HRS AND 2J55 MAGNETRON. ALIGNED KLYSTRON AND AFC.  
LOCAL. TARGETS AT 40 MILES NOW OKAY.

11-24-81 3-CM, VESSEL AT BUSAN KOREA. TARGETS POOR BEYOND  
1530 HRS 6 MILES. WEAK KLYSTRON. REPLACED 2K55 KLYSTRON,  
LOCAL. ALIGNED SAME. TARGETS NOW OKAY AT NEARLY 40 MILES.



11-27-81 10-CM, VESSEL AT YOKOHAMA. NO TARGETS, NO MAGNETRON CURRENT DUE TO OPEN FILAMENT IN MODULATOR TUBE. REPLACED 4C35-A MODULATOR TUBE. TARGETS NOW OKAY OUT TO 30 MILES OR MORE.

12-27-81 3-CM, VESSEL AT SEA NEAR KOBE. POOR TARGETS, WEAK BEYOND ABOUT 8 MILES. WEAK TARGETS DUE TO TR DETERIORATION. REPLACED 3-CM TR TUBE AND ALIGNED KLYSTRON. SHIPS SEEN AT 16 MILES, LAND AT 30 MILES.

12-27-81 10-CM, VESSEL AT SEA NEAR KOBE. SLIGHT BLURRING OF PICTURE, SEEP SLIGHTLY JERKY. SERVO SYSTEM ON SWEEP SLIGHTLY OUT OF ALIGNMENT. ADJUSTED POTS R1 AND R2 OF SERVO-VIDEO AMPLIFIER BOARD. SWEEP NOW SMOOTH, PICTURE UN-BLURRED.

01-01-82 10-CM, VESSEL AT ANCHOR KAOHSIUNG TAIWAN. NO SWEEP ON PPI. PICTURE TUBE TOTALLY DARK. INTERMITTENT FUSE IN CRT ANODE POWER SUPPLY. REPLACED FUSE. OPERATION RESTORED.

01-06-82 10-CM, VESSEL AT SEA, 25N 155E. CRT DEFLECTION COIL NOT TURNING. DEFLECTION COIL RUBBING SLIGHTLY ON NECK OF CRT. RE-CENTERED CRT IN DEFLECTION COIL, AND SLIGHTLY RE-ALIGNED POTS R1,R2,R3 OF VIDEO SWEEP CIRCUIT BOARD.

01-15-82 3-CM, VESSEL AT SEA BOUND FOR LONG BEACH. NO TARGETS BEYOND ABOUT 10 OR 12 MILES. 1N23E SIGNAL CRYSTAL SHOWS POOR FRONT-TO-BACK RESISTANCE ON OHMMETER TEST. REPLACED SIGNAL CRYSTAL. ADJUSTED AFC TUNING CONTROL FOR MAXIMUM CURRENT. LAND TARGETS OKAY AT FULL RANGE, HIGHEST SCALE 48 MILES.

08-21-82 10-CM, VESSEL AT KAOHSIUNG TAIWAN. 4 DEGREE ERROR IN HEADING FLASHER. LOOSE MOUNTING SCREWS ON HEADING FLASHER MICROSWITCH. ADJUSTED AND TIGHTENED MOUNTING BRACKET OF HEADING FLASHER MICROSWITCH, TOPSIDE IN ANTENNA SCANNER PEDESTAL.

08-24-82 10-CM, VESSEL AT SEA. SPOKING OF PICTURE SWEEP ON 3 MILE SCALE. SWEEP AMPLIFIER OUT OF ADJUSTMENT, PROBABLY DUE TO VIBRATION. ADJUSTED INTERNAL SWEEP GAIN POT ON CIRCUIT BOARD INSIDE RADAR INDICATOR.

09-01-82 10-CM, VESSEL AT HONOLULU. NO TARGETS, NO MAGNETRON CURRENT. DEFECTIVE 2N4240 TRANSISTOR IN TRIGGER CHASSIS AND 3 BLOWN POWER SUPPLY FUSES. REPLACED TRIGGER UNIT, REPLACED 3 FUSES IN INDICATOR POWER SUPPLY. TARGETS NOW OKAY, MAGGIE CURRENT NORMAL.

09-19-82 3-CM, VESSEL AT SEA. SPOKING OF PICTURE SWEEP ON 12 MILE SCALE, LOW CURSOR ILLUMINATION. SWEEP AMPLIFIER OUT OF ADJUSTMENT, 3 LAMPS BURNED-OUT IN CURSOR. ADJUSTED SWEEP LINEARITY POT ON CIRCUIT BOARD INSIDE INDICATOR, REPLACED 3 #387 CURSOR LAMPS.

09-26-82 3-CM, VESSEL AT NAHA OKINAWA. TARGETS WEAKER THAN NORMALLY EXPECTED. SLIGHT DE-TUNING OF KLYSTRON, DUE PROBABLY TO VIBRATION. RE-TUNED KLYSTRON STRUT FOR MAX ECHO ON OSCILLOSCOPE COUPLED TO VIDEO LINE.

10-03-82 10-CM, VESSEL AT YOKOHAMA JAPAN. NO TARGETS, NO MAGNETRON CURRENT. 24 VOLT POWER SUPPLY HAS R-6 RESISTOR OPEN AND ZENER CR-11 SHORTED. REPLACED RESISTOR R-6 43-K AND 30-V ZENER CR-11 TO RESTORE RADAR TO OPERATION.

10-08-82 3-CM. VESSEL AT SEA. ERRATIC SWEEP OF CRT DEFLECTION COIL. DETUNING OF SERVO AMP GAIN POT AND NOTCH FILTERS. ALIGNED SERVO-VIDEO AMP POTS R1,R2,R3 TO RESTORE CRT SWEEP TO SMOOTH MOTION.

10-11-82 3-CM, VESSEL AT HONOLULU. NO ILLUMINATION OF DIAL HEAD ASSEMBLY OF RADAR INDICATOR. OPEN DIMMER POT R1, 250 OHMS. REPLACED 250 OHM LAMP DIMMER POT R-1 FROM SHIPS SPARES. LAMPS NOW BURNING OKAY, DIMMER OKAY.

10-11-82 10-CM, VESSEL AT HONOLULU. TARGETS QUITE WEAK, ARRIVAL HONOLULU ACCORDING TO MATES. WEAK TR TUBE. REPLACED TYPE BTR-136 TR TUBE, ALIGNED TR TUBE AND KLYSTRON STRUT. TARGETS OKAY NOW AT 32 MILES.

10-18-82 10-CM, VESSEL AT SAN FRANCISCO. WEAK TARGETS, BUOYS NOT SEEN ON ARRIVAL PORT. HI-RESISTANCE AT 4C35 MODULATOR PLATE CAP CERAMIC. REPLACED TYPE 4C35-A MODULATOR TUBE. SMALL TARGETS IN BAY AREA NOW OKAY.

01-09-83 3-CM, VESSEL AT SEA. ERRATIC AND INCOMPLETE SWEEP ON CRT SCREEN. WORN-OUT BEARINGS IN CRT SERVO MOTOR. REPLACED SERVO MOTOR WITH ONBOARD SPARE, CENTERED CRT NECT IN DEFLECTION COIL, ALIGNED GAIN POT AND NOTCH FILTER OF SERVO-VIDEO CIRCUIT BOARD. RADAR SWEEP OKAY. SIGNAL CRYSTAL CURRENT ABNORMAL ALL VOYAGE, SHOWS 2 PERCENT OF METER SCALE RATHER THAN 40 TO 80 PERCENT RECOMMENDED BY RADAR COMPANY, ALSO SENSITIVITY APPEARS LESS THAN IT SHOULD BE; TARGETS FADE AT BEYOND ABOUT 12 MILES RATHER THAN 20 MILES WHICH I AM USED TO SEEING. NO ACTION TAKEN THIS DATE TO CORRECT CRYSTAL CURRENT OR TO IMPROVE SENSITIVITY.

01-12-83 3-CM, VESSEL AT NAHA OKINAWA. LOW SIGNAL CRYSTAL  
1850- CURRENT, LOWER THAN NORMAL SENSITIVITY AND TARGET  
1930 HRS RANGE. INSUFFICIENT CRYSTAL PROBE COUPLING AND  
LOCAL. KLYSTRON SLIGHTLY OFF FREQUENCY. ADJUSTED SIGNAL  
PROBE COUPLING TO RAISE CURRENT FROM 2 PERCENT TO  
50 PERCENT ON TEST METER. ALIGNED KLYSTRON  
OSCILLATOR FREQUENCY TO IMPROVE TARGET AMPLITUDE  
BY OVER 20 PERCENT AT VIDEO AMPLIFIER. ALSO  
RE-CENTERED PICTURE SWEEP DUE TO ABOUT 1/4-INCH  
OFF-CENTER ON PICTURE TUBE.

01-12-83 10-CM, VESSEL AT NAHA OKINAWA. LOWER THAN NORMAL  
1930- SENSITIVITY AND TARGET RANGE. ALSO NO ILLUMINATION  
1950 HRS ON VARIABLE RANGE MILEAGE COUNTER. RESULT OF  
LOCAL. VIBRATION AND COMPONENT AGING. REPLACED TYPE #1829  
BURNED-OUT LAMP WHICH ILLUMINATES MILEAGE COUNTER  
OF VARIABLE RANGE MARKER.

02-17-83 3-CM, VESSEL AT SEA. CAPTAIN SAYS 3-CM RADAR NOT  
0800- SHOWING TARGETS BEYOND 6 OR 7 MILES OF RANGE. FOUND  
0900 & 1N23 SIGNAL CRYSTAL TO HAVE POOR RESISTANCE  
1230- READINGS. REPLACED 1N23 SIGNAL CRYSTAL AND ALIGNED  
1400 HRS KLYSTRON FOR MAX SEA RETURN. ALSO SET AFC CRYSTAL  
LOCAL. CURRENT TO PROPER LEVEL.

02-19-83 3-CM, YOKOHAMA. SENSITIVITY STILL NOT AS GOOD AS IT  
0830- SHOULD BE FOLLOWING 2-17-83 ALIGNMENT ON SEA  
1000 HRS RETURN. ALIGNED KLYSTRON TUNING AND SIGNAL CRYSTAL  
LOCAL. CURRENT ON FIXED LAND TARGETS. RADAR NOW SHOWING  
LAND AT 35 MILES AND SHIPS AT NEARLY 20 MILES,  
SENSITIVITY MUCH IMPROVED.

03-13-83 10-CM, VESSEL AT LONG BEACH. OCCASIONAL SPOKING ON  
0900- CRT DISPLAY PRIOR TO ARRIVAL LONG BEACH. SLIGHT  
1050 HRS MISALIGNMENT OF 12 MILE SWEEP AMP INTERNAL POT.  
LOCAL. RE-ALIGNED 12 MILE SWEEP POT, ALSO CLEANED RANGE  
WAFER SWITCH CONTACTS ON BOTH 3-CM AND 10-CM  
RADARS.

08-08-83 10-CM, VESSEL AT HONOLULU. DEGRADED RADAR RECEIVER  
2030- SENSITIVITY. KLYSTRON AND TR CELL OFF FREQUENCY,  
2300 HRS DUE TO SHIPS VIBRATION. REALIGNED KLYSTRON AND TR  
LOCAL. CELL TO PROVIDE MAXIMUM RECEIVER GAIN AND GOOD  
SENSITIVITY TO TARGETS.

08-15-83 3-CM, VESSEL AT LONG BEACH. REDUCED SENSITIVITY TO  
1830- TARGETS. POOR TRANSCONDUCTANCE OF TYPE 4C35-A  
2055 HRS MODULATOR TUBE. REPLACED MODULATOR TUBE TO RESTORE  
LOCAL. GOOD RADAR SENSITIVITY.

08-20-83 10-CM, VESSEL AT SAN FRANCISCO. CRT SWEEP NOT  
0800- COMPLETE, XMTR VENT FAN NOT RUNNING. CRT DEFLECTION  
1030 HRS COIL BRUSHES WORN-OUT, VENT FAN BURNED-OUT.  
LOCAL. REPLACED CRT DEFLECTION COIL BRUSHES AND XMTR  
COOLING FAN MOTOR, TO RESTORE NORMAL RADAR  
OPERATION.

08-24-83 3-CM, VESSEL AT SEA. POOR SENSITIVITY TO TARGETS  
0630- AND 2-DEGREE ERROR OF HEAD FLASHER. SLIGHT  
0800 HRS DE-TUNING OF KLYSTRON, AND LOOSE SERVO MOTOR  
LOCAL. MOUNTS DUE TO VIBRATION OF VESSEL. RE-TUNED  
KLYSTRON FOR PROPER AFC AND TIGHTENED SERVO MOTOR  
MOUNTING BOLTS.

09-08-83 10-CM, VESSEL AT KOBE JAPAN. PICTURE INTERMITTENT  
1210- ON 12,24,48 MILE RANGES. INTERMITTENT CONTACTS  
1435 HRS WITHIN RANGE SCALE WAFER SWITCH. TIGHTENED 2 LOOSE  
LOCAL. BOLTS HOLDING WAFER SECTIONS TO STAND-OFF  
INSULATORS OF RANGE SWITCH, CLEANED WAFER CONTACTS  
TO RESTORE NORMAL RADAR OPERATION ON ALL RANGES.

09-15-83 10-CM, VESSEL AT SEA. ISLAND TARGET EXTREMELY WEAK  
1300- AT ABOUT 8 MILES RANGE. OPEN CIRCUIT IN TYPE 1N21WE  
1400 HRS SIGNAL CRYSTAL. REPLACED DEFECTIVE SIGNAL CRYSTAL  
LOCAL. TO RESTORE RADAR TO NORMAL OPERATION AND EXCELLENT  
TARGET SENSITIVITY.

09-21-83 10-CM, VESSEL AT LONG BEACH. NO PICTURE, ALSO BAD  
1200- SMELLING SMOKE COMING FROM INDICATOR. BURNED-UP  
1630 HRS RESISTOR IN 100-VOLT INDICATOR POWER SUPPLY  
LOCAL CHASSIS. CHANGED-OUT INDICATOR POWER SUPPLY CHASSIS  
TO RESTORE NORMAL RADAR OPERATION.

09-25-83 10-CM, VESSEL AT SAN FRANCISCO. INCOMPLETE OR  
1730- ERRATIC PICTURE SWEEP ON INDICATOR. SLIPPAGE OF  
0110 HRS PULLEYS ON SERVO-SYNCHRO SHAFTS. TIGHTENED LOOSE  
LOCAL. PULLEY SHAFT BOLTS AND ALIGN NOTCH FILTERS OF  
SERVO AMPLIFIER TO RESTORE SMOOTH PICTURE SWEEP.

09-26-83 3-CM, VESSEL AT SAN FRANCISCO. NO HEADING FLASHER  
0600- ON PICTURE SCREEN. BROKEN HEADING FLASHER MICRO-  
1100 HRS SWITCH. REPLACED HEADING FLASHER MICROSWITCH AND  
LOCAL. ALIGNED SAME TO 360 RELATIVE, CADET ASSISTING WITH  
WALKIE-TALKIE AT INDICATOR.

10-02-83 10-CM, VESSEL AT SEA. LOSS OF PICTURE SWEEP.  
2000- DEFECTIVE TRANSISTOR Q-15 ON SWEEP AMPLIFIER  
2300 HRS BOARD. REPLACED Q-15 TRANSISTOR IN SWEEP AMP TO  
LOCAL. RESTORE NORMAL PICTURE SWEEP.

10-04-83 3-CM, VESSEL AT SEA. UNLOCKING OF AFC, RADAR OKAY  
1230- ON MANUAL MODE. BURNED-OUT AFC SIGNAL CRYSTAL.  
1400 HRS REPLACE AFC CRYSTAL AND ALIGNED AFC CURRENT AND  
LOCAL. KLYSTRON TO RESTORE NORMAL AFC OPERATION OF RADAR.

10-08-83 10-CM, VESSEL AT KOBE JAPAN. NO PICTURE SWEEP ON  
1430- 24 MILE RANGE SCALE. MISALIGNED GAIN POT ON 24  
1700 HRS MILE SWEEP AMPLIFIER, DIRTY WAFER. REALIGNED SWEEP  
LOCAL. GAIN POT AND CLEANED CONTACTS OF RANGE SWITCH TO  
RESTORE NORMAL 24 MILE SWEEP.

10-10-83 3-CM, VESSEL AT NAHA OKINAWA. INTERMITTENT SWEEP ON  
1215- 12 MILE RANGE. DIRTY CONTACTS OF RANGE SCALE WAFER  
1300 HRS SWITCH. CLEANED RANGE WAFER CONTACTS TO RESTORE  
LOCAL. NORMAL OPERATION.

10-12-83 3-CM AND 10-CM, VESSEL AT KAOHSIUNG TAIWAN.  
1015- BOTH PICTURE SCREENS BADLY FOGGED WITH MOISTURE,  
1135 HRS RAINY WEATHER IN PORT. MOISTURE BUILD-UP IN DAMP  
LOCAL. WEATHER. REMOVED MOISTURE ON VIEWING LENSES, USING  
HAIR DRYER, TO RESTORE CLEAR VIEWING.

10-30-83 10-CM, VESSEL AT LONG BEACH. CATALINA ISLAND  
UNSEEN ON RADAR, AND ARCING IN RANGE SWITCH.  
SHORTED DIODE, WEAK MAGNETRON, BURNED WAFER  
CONTACTS S-1. REPLACE SHORTED DIODE, REPLACE  
2J70-A MAGNETRON, REPLACE 24 MILE RANGE WAFER  
SECTION OF SWITCH #S-1.

10-31-83 10-CM, VESSEL AT LONG BEACH. SWEEP INTERMITTENT  
ONCE IN AWHILE ON ALL RANGES. BROKEN WHITE/ORANGE  
LEAD AT EDGE CONNECTOR OF PC BOARD #4. REPAIR  
BROKEN WIRE AT EDGE CONNECTOR OF PC BOARD #4.

01-28-84 10-CM, VESSEL AT YOKOHAMA. POOR SENSITIVITY TO  
TARGETS. DE-TUNED CONDITION OF RF CIRCUIT. ALIGN  
KLYSTRON AND TIGHTEN LOOSE MOUNTING BOLTS AT R-F  
CRYSTAL AND AFC MIXER ASSEMBLY.

02-05-84 10-CM, VESSEL AT SEA. PICTURE SWEEP ERRATIC AND  
INTERMITTENT. LOOSE CRT SERVO MOUNTING. TIGHTEN  
LOOSE BOLTS OF FLANGE OF CRT DEFLECTION COIL  
SERVO, ALIGN SERVO TO PROPER AZIMUTH.

02-13-84 10-CM, VESSEL AT HONOLULU. LACK OF RECEIVER  
SENSITIVITY. WEAK TR FUNCTION. REPLACE TYPE BTR-136  
TR TUBE AND ALIGN SAME FOR MAXIMUM SENSITIVITY.

02-22-84 3-CM, VESSEL AT SAN FRANCISCO. UPGRADE RADAR BY  
ADDING A MANUALLY ADJUSTABLE COMPASS CARD AT  
INDICATOR UNIT.

02-23-84 10-CM, VESSEL AT SAN FRANCISCO. NO PICTURES ON  
ANY RANGE. LOSS OF 24 AND 200 VOLTAGES AT POWER  
SUPPLIES. WITH ITT TECH, REPLACED 200 VOLT SUPPLY  
AND 24 VOLT SUPPLY, REPLACE DEFECTIVE POWER  
TRANSISTOR IN TRIGGER UNIT TO RESTORE NORMAL  
OPERATION.

02-25-84 3-CM, VESSEL AT SEA. LOSS OF RANGE SCALE INDICATOR LIGHTS. BROKEN WIRE FROM LAMP POWER SUPPLY. RE-SOLDER BROKEN WIRE ON 3-CM RANGE SCALE WAFER SWITCH TO RESTORE LIGHTS.

03-01-84 10-CM, VESSEL AT SEA. NO PICTURE ON 6,12,24,48 MILE RANGES. DEFECTIVE TIMING CHAIN, HI-RANGES. REPLACE DEFECTIVE TIMING CHAIN.

03-08-84 3-CM, VESSEL AT NAHA OKINAWA. NO PICTURE ON 6 MILE RANGE. INTERMITTENT VIDEO-SWEEP PC BOARD. CLEANED DIRTY CONTACTS ON EDGE CONNECTOR OF VIDEO-SWEEP BOARD, ALIGN SWEEP POTS FOR GOOD OPERATION.

03-14-84 10-CM, VESSEL AT KOBE JAPAN. TARGETS WEAK BEYOND ABOUT 12 MILES DISTANCE. POOR FRONT-TO-BACK RESISTANCE OF SIGNAL CRYSTAL. REPLACE TYPE 1N21-E SIGNAL CRYSTAL TO IMPROVE SENSITIVITY OF RADAR RECEIVER.

03-27-84 10-CM, VESSEL AT LONG BEACH. CATALINA ISLAND AT 24 MILES SHOWING BUT IMAGE SOMEWHAT BROKEN. REDUCED TRANSMITTER OUTPUT DUE TO WEAK MAGNETRON. REPLACED TYPE 2J70 MAGNETRON TO RESTORE GOOD, WELL-DEFINED IMAGE OF DISTANT TARGETS SUCH AS CATALINA ISLAND.

06-26-84 10-CM, VESSEL AT YOKOHAMA. VRM READS 0.5 MILE LOW ON ALL RANGES. MISALIGNMENT OF VRM AND TIMING CHAIN CIRCUITS. ALIGNED VRM C1,C2 AND TIMING CHAIN R1 POT SO VRM COINCIDES WITH FIXED MARKERS.

06-26-84 3-CM, VESSEL AT YOKOHAMA. VRM READS 0.2 MILE LOW ON ALL RANGES. MISALIGNMENT OF VRM AND TIMING CHAIN CIRCUITS. ALIGNED VRM C1,C2 AND TIMING CHAIN R1 POT SO VRM COINCIDES WITH FIXED MARKERS.

07-06-84 10-CM, VESSEL AT SEA. INTERMITTENT RANGE SWITCHING, AND 3 DEGREE ERROR IN HEADING FLASHER. LOOSE WAFER SWITCH SECTIONS AND BOLTS ON FLASHER MICROSWITCH. TIGHTENED WAFER SWITCH MOUNTING BOLTS, AND RE-ALIGN FLASHER SWITCH TO DEAD-AHEAD FLASH.

07-11-84 10-CM, VESSEL AT SEA. SOUND OF ARCING, SMELL OF SMOKE IN 10-CM XMTR CABINET. ARCING AT MAGNETRON HV WIRING. RE-INSULATE 10-CM MAGNETRON CONNECTIONS USING PLASTIC AND SHEET RUBBER.

08-03-84 10-CM, VESSEL AT LONG BEACH. LOW SENSITIVITY, LOW MAGNETRON CURRENT. DEFECTIVE MAGNETRON, TYPE 2J70B. REPLACE 2J70B MAGNETRON TO RETURN RADAR SENSITIVITY TO NORMAL.

- 08-27-84 3-CM AND 10-CM, VESSEL AT BUSAN KOREA. POOR SENSITIVITY TO TARGETS BEYOND ABOUT 12 MILES. LOOSE 3-CM CRYSTAL MOUNTING AND SLIGHT DE-TUNING BOTH RADARS. TIGHTEN 3-CM CRYSTAL, REPLACE 10-CM CRYSTAL, RE-TUNE 3-CM KLYSTRON, 10-CM KLYSTRON, 10-CM TR. SENSITIVITY NOW NORMAL.
- 08-28-84 10-CM, VESSEL AT SEA. SLIGHT SPOKING OF 10-CM PICTURE. SLIGHT DELAY OF CRT SERVO DEFLECTION COIL SWEEP. RE-TUNE NOTCH FILTER POT ON SERVO-VIDEO BOARD TO PROVIDE SMOOTH UNSPOKED SWEEP OF PICTURE.

C'

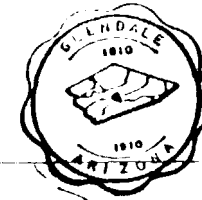


# Study Guide and Reference Material

# COMMERCIAL RADIO OPERATOR EXAMINATIONS



**REVISED MAY 15, 1955**



UNITED STATES GOVERNMENT PRINTING OFFICE

WASHINGTON : 1965